IN THE CLAIMS:

1. (CURRENTLY AMENDED) An apparatus for improved dynamic angiographic X ray imaging of a subject's body infused with contrast agent, said apparatus comprising:

an x ray source ~~adapted to emit~~ capable of emitting X rays directed to pass through the subject's body wherein said X ray beam is polychromatic;

a sensor system ~~adapted to receive~~ capable of receiving attenuated X rays that passed through the subject's body, wherein said sensor comprises:

~~detection means~~ a detector divided into a plurality of detector elements, wherein each one of said plurality of detection elements is adapted to convert photon energy of a portion of said attenuated X rays into electric charges; and

at least one readout chip divided into a plurality of channels wherein each one of said plurality of channels is electronically connected to one of said plurality of detection elements and wherein each one of said plurality of channels is adapted to convert said electric charges into digital data;

an acquisition system ~~adapted to receive~~ capable of receiving said digital data from said sensor and generate at least two electronic representations wherein one of said at least two electronic representations is attained from low energy photons and another one of said at least two electronic representations is attained from high energy photons wherein said at least two electronic representations are measured simultaneously at the subject and at a certain position of said X ray source;

~~processing means adapted to manipulate~~ a processor capable of manipulating said at least two electronic representations into at least one image; and

~~displaying means~~ a display adapted to display said at least one image[[;]],

whereby said at least one image attained from at least two energy bins amplify the appearance of the contrast agent in the blood vessels in respect with the surrounding tissues of the subject's body.

2. (CURRENTLY AMENDED) The apparatus as claimed in Claim 1, wherein said ~~detection means~~ detector is a pixel detector chip made of a semiconductor material.

3. (CURRENTLY AMENDED) The apparatus as claimed in Claim 2, wherein said semiconductor material is ~~selected from a group of semiconductor materials such as~~ Cadmium Zinc Telluride (CZT).

4. (CURRENTLY AMENDED) The apparatus as claimed in Claim 1, wherein said ~~detection means~~ detector is a detector chip made of a scintillator material coupled to light to charge conversion elements.

5. (CURRENTLY AMENDED) The apparatus as claimed in Claim 4, wherein said scintillator material is ~~selected from a group of materials such a~~s CsI(Na) or CsI(Tl).

6. (ORIGINAL) The apparatus as claimed in Claim 4, wherein said light to charge conversion elements comprise an array of Si photodiodes.

7. (ORIGINAL) The apparatus as claimed in Claim 1, wherein said at least one readout chip is provided with at least two programmable threshold discriminators so as to allow each one of said plurality of channels to output a representation of a number of photons carrying energy below a predetermined threshold, between said predetermined threshold and a higher predetermined threshold, and above said higher predetermined threshold.

8. (ORIGINAL) The apparatus as claimed in Claim 7, wherein said at least one readout chip is provided with a preamplifier and a pulse shaper.

9. (CURRENTLY AMENDED) The apparatus as claimed in Claim 7, further comprising at least two counters adapted to count events detected in the at least two programmable threshold discriminators.

10. (ORIGINAL) The apparatus as claimed in claim 1, wherein the infused contrast agent is Iodine solution.

11. (ORIGINAL) The apparatus as claimed in claim 1, wherein said low energy photons are set below the K edge of the contrast agent and said high energy photons are set above the K edge of the contrast agent.

12. (ORIGINAL) The apparatus as claimed in claim 1, wherein said low energy photons are set just above the K edge of the contrast agent and said high energy photons are set further above the K edge of the contrast agent.

13. (ORIGINAL) The apparatus as claimed in Claim 1, wherein a portion of the subject's body is the chest and wherein coronary blood vessels are imaged.

14. (ORIGINAL) The apparatus as claimed in Claim 13, wherein a difference image of said low energy photons presentation and said high energy photons presentation is generated and displayed so as to amplify the appearance of the contrast agent, wherein said difference image is motion artifacts prone.

15. (ORIGINAL) The apparatus as claimed in Claim 1, wherein a portion of the subject's body is the head and neck and wherein cranial or cranial supply blood vessels are imaged.

16. (ORIGINAL) The apparatus as claimed in Claim 1, wherein peripheral blood vessels are imaged.

17. (ORIGINAL) The apparatus as claimed in Claim 1, wherein images are acquired, processed and displayed multiple times every second at a short time lag from acquisition so as to generate real time imaging of the subject's body.

18. (CURRENTLY AMENDED) The apparatus as claimed in Claim 1, wherein said ~~processing means~~ processor is adapted to process said at least two electronic representations by producing a normalized high energy image of one of the electronic representation attained from high energy photons to another electronic representation attained from low energy photons and subtraction of said normalized high energy image from said another electronic representation.

19. (CURRENTLY AMENDED) The apparatus as claimed in Claim 1, wherein said ~~processing means~~ processor is adapted to process said at least two electronic representations by producing a normalized high energy image of one of the electronic representation attained from high energy photons to another electronic representation attained from low energy photons and subtraction of a pre-determined fraction of the normalized high energy image from said another electronic representation.

20. (CURRENTLY AMENDED) A dynamic method for producing images of improved X ray angiography of a subject's body, said method comprising:

directing polychromatic X ray beam to pass through the subject's body;

positioning a sensor system adapted to receive attenuated X rays that passed through said subject's body, said sensor system comprising detection means divided into a plurality of detector elements, wherein each one of said plurality of detection elements is adapted to convert photon energy of a portion of said attenuated X rays into electric charges, and at least one readout chip provided with at least two discriminators, said at least one readout chip divided into a plurality of channels wherein each one of said plurality of channels is electronically connected to one of said plurality of detection

elements and wherein each one of said plurality of channels is adapted to convert said electric charges into digital data;

setting threshold levels for said at least two discriminators for each one of said plurality of channels at least once;

injecting a contrast agent into blood vessels of the subject's body;

positioning said subject so that X ray beam passes through the body of the subject and attenuated X rays that passed through the subject's body are received by said sensor system;

acquiring single photon counting data so as to simultaneously establish at least two images from at least one of low photon energy window and at least one of high energy window; and

~~Processing~~ processing said at least two images so as to provide high contrast and motion artifact free image of the subject's blood vessels.

21. (ORIGINAL) The method as claimed in claim 20, wherein said low energy window is set below the K edge of said contrast agent and said high energy window is set above the K edge of said contrast agent.

22. (ORIGINAL) The method as claimed in claim 20, wherein said low energy window is set just above the K edge of said contrast agent and said high energy window is set further above the K edge of said contrast agent.

23. (ORIGINAL) The method as claimed in Claim 20, wherein setting threshold levels comprises irradiating said detecting means with radiation of at least two predetermined energy levels while monitoring output counting rate so as to set the threshold level slightly below the level in which the count rate drops.

24. (ORIGINAL) The method as claimed in Claim 23, wherein said detecting means is irradiated with X ray photons at 32keV for setting one threshold level and with gamma rays of 59.5keV for setting a second threshold level.

25. (ORIGINAL) The method as claimed in Claim 20, wherein said processing said at least two images comprises

normalizing one of said at least two images attained from said high energy window to another image attained from said low energy window so as to acquire normalized high energy image;

subtracting said normalized high energy image from said another image attained from said low energy image.

26. (ORIGINAL) The method as claimed in Claim 20, wherein said processing said at least two images comprises

normalizing one of said at least two images attained from said high energy window to another image attained from said low energy window so as to acquire normalized high energy image;

subtracting a pre-determined fraction of the normalized high energy image from said low energy image.

27. (ORIGINAL) The method as claimed in Claim 20, wherein the method is used to image the subject's coronary blood vessels.

28. (ORIGINAL) The method as claimed in Claim 20, wherein the subject's body is the head and neck and wherein cranial or cranial supply blood vessels are imaged.

29. (ORIGINAL) The method as claimed in Claim 20, wherein peripheral blood vessels are imaged.